

AMENDMENTS TO THE CLAIMS

- 1 1. (Currently Amended) A serial communications system comprising:
2 a scrambler for converting original received data into scrambled data; and
3 an ECC encoder for converting said scrambled data into ECC-encoded data.
- 1 2. (Original) The system as recited in Claim 1, further comprising:
2 a serializer for converting said ECC-encoded data into serialized data;
3 wherein the ECC-encoded data includes frame alignment information; and
4 the system further comprises a receiver for receiving said serialized data and
5 converting the serialized data into data frames based upon the frame alignment information.
- 1 3. (Original) The system as recited in Claim 2, wherein the receiver comprises:
2 a frame-recoverer for converting said serialized data into data frames;
3 an ECC decoder for converting said data frames into ECC-decoded data and
4 error indications; and
5 a scrambler for converting said ECC-decoded data into de-scrambled data.
- 1 4. (Original) The system as recited in Claim 5, wherein said frame-recoverer uses
2 said error indications in converting said serialized data into data frames.
- 1 5. (Original) The system as recited in Claim 1, wherein said ECC encoder applies an
2 error correction code in converting said scrambled data into said ECC-encoded data.
- 1 6. (Currently Amended) A serial communications method, comprising the steps of:
2 converting original received data into scrambled data; and
3 converting said scrambled data into ECC-encoded data.

1 7. (Original) The method as recited in Claim 6, further comprising the steps of:
2 generating a serial stream of the ECC-encoded data; and
3 transmitting said serial stream.

1 8. (Original) The method of Claim 7, wherein:
2 the ECC-encoded data includes frame alignment information; and
3 the method further comprises receiving said serialized data and converting
4 said serialized data into data frames based upon said frame alignment information.

1 9. (Original) The method of Claim 7, further comprising:
2 receiving said serialized data;
3 converting said serialized data into data frames;
4 converting said data frames into ECC-decoded data and error indications; and
5 converting said ECC-decoded data into de-scrambled data.

1 10. (Original) The method of Claim 9, wherein the step of converting the serialized
2 data comprises converting the serialized data into data frames based upon said error
3 indications.

1 11. (Withdrawn) A serial communications system comprising:
2 an ECC decoder for converting data frames into ECC-decoded data; and
3 a de-scrambler for converting said ECC-decoded data into de-scrambled data.

1 12. (Withdrawn) The system of Claim 11, further comprising a frame-recoverer for
2 converting serialized data into said data frames.

1 13. (Withdrawn) The system as recited in Claim 12, wherein:
2 said ECC decoder generates error indications; and

3 said frame-recoverer uses said error indications in converting said serialized
4 data into said data frames.

1 14. (Withdrawn) The system as recited in Claim 13, wherein said frame-recoverer
2 generates a frame clock that is shifted in phase based upon said error indications, said frame-
3 recoverer converting said serialized data into said data frames using said frame clock.

1 15. (Withdrawn) The system as recited in Claim 14, wherein said frame-recoverer
2 shifts in phase said frame clock by a predetermined number of periods of a bit clock based
3 upon said error indications.

1 16. (Withdrawn) The system as recited in Claim 13, wherein said frame-recoverer
2 comprises:

3 a plurality of registers, each register being controlled to receive said serialized
4 data and form two or more frames of parallel data therefrom;

5 a selection control circuit for receiving said error indications and generating at
6 least one control signal; and

7 selection circuitry coupled to receive as inputs the output of said registers and
8 said control signal from said selection control circuit, and output a set of parallel data
9 appearing at the input of said selection circuitry, said number of bits in said set of parallel
10 data corresponding to the number of bits in a frame of data.

1 17. (Withdrawn) The system as recited in claim 16, wherein

2 the selection circuitry comprises a plurality of individual multiplexer circuits,
3 the number of multiplexer circuits corresponding to the number of bits n in a frame of data,
4 each multiplexer circuit being an $n+1:1$ multiplexer circuit.

1 18. (Withdrawn) The system as recited in Claim 13, wherein said error indications
2 are associated with errors in said data frames, said ECC-decoder correcting some of said
3 errors.

1 19. (Withdrawn) A serial communications system comprising:
2 an ECC decoder for converting data frames into ECC-decoded data and error
3 indications; and
4 a frame recoverer for converting serialized data into said data frames using
5 said error indications.

1 20. (Withdrawn) The system as recited in Claim 19, wherein said frame-recoverer
2 generates a frame clock that is shifted in phase based upon said error indications and converts
3 said serialized data into said data frames using said frame clock.

4 21. (Withdrawn) The system as recited in Claim 20, wherein said frame-recoverer
5 shifts in phase said frame clock by a predetermined number of periods of a bit clock based
6 upon said error indications.

1 22. (Withdrawn) The system as recited in Claim 19, wherein said frame-recoverer
2 comprises:
3 a plurality of registers, each register being controlled to receive said serialized
4 data and form two or more frames of parallel data therefrom;
5 a selection control circuit for receiving said error indications and generating at
6 least one control signal; and
7 selection circuitry coupled to receive as inputs the output of said registers and
8 said control signal from said selection control circuit, and output a set of parallel data

9 appearing at the input of said selection circuitry, the number of bits in said parallel set of data
10 corresponding to the number of bits in a frame of data.

1 23. (Withdrawn) The system as recited in claim 22, wherein
2 the selection circuitry comprises a plurality of individual multiplexer circuits,
3 the number of multiplexer circuits corresponding to the number of bits n in a frame of data,
4 each multiplexer circuit being an $n+1:1$ multiplexer circuit.

5 24. (Withdrawn) The system as recited in Claim 19, wherein said error indications
6 are associated with errors in said data frames, said ECC-decoder correcting some of said
7 errors.

1 25. (Withdrawn) The system as recited in claim 19, further comprising:
2 a de-scrambler for converting said ECC-decoded data into de-scrambled data.

1 26. (Original) A serial communications method comprising:
2 converting serialized data into data frames as a function of error indications;
3 and
4 converting said data frames into ECC-decoded data and said error indications.

1 27. (Withdrawn) The method as recited in Claim 26, further comprising:
2 de-scrambling said ECC-decoded data into de-scrambled data.

1 28. (Withdrawn) The method as recited in Claim 26, wherein the step of converting
2 said serialized data comprises:
3 generating a frame clock that is shifted in phase based upon said error
4 indications; and
5 converting said serialized data into said data frames using said frame clock.



1 29. (Withdrawn) The method as recited in claim 26, wherein the step of converting
2 said serialized data comprises:

3 temporarily maintaining bits of said serialized data sufficient to form two or
4 more frames of parallel bits;

5 selecting a frame of data from said maintained bits based upon said error
6 indications, said frame of data being a frame of data in the data frames; and

7 repeating said steps of temporarily maintaining and selecting for generating
8 each data frame from said serialized data.

1 30. (Withdrawn) The method as recited in claim 26, further comprising:

2 initially scrambling received data into scrambled data;

3 converting said scrambled data into ECC-encoded data; and

4 converting said ECC-encoded data into said serialized data.

1 31. (Withdrawn) A serial communications method comprising:

2 converting data frames into ECC-decoded data and error indications; and

3 de-scrambling said ECC-decoded data into de-scrambled data.

1 32. (Withdrawn) The method as recited in Claim 31, further comprising:

2 initially converting serialized data into said data frames as a function of said
3 error indications.

1 33. (Withdrawn) The method as recited in claim 31, further comprising:

2 initially scrambling received data into scrambled data; and

3 performing an ECC encoding operation on said scrambled data to generate said
4 data frames.

- 1 34. (New) A serial communication system comprising:
- 2 a scrambler for converting received data into scrambled data, said received data
- 3 being without redundant bits inserted by said serial communication system; and
- 4 an ECC encoder for converting said scrambled data into ECC-encoded data.